KHYBER MEDICAL UNIVERSITY

RENAL DIALYSIS TECHNOLOGY CURRICULUM

STUDY GUIDE SEMESTER 6

16 Weeks Activity Planner

2024-25

CENTRAL CURRICULUM & ASSESSMENT COMMITTE FOR NURSING,

REHABILITATION SCIENCES & ALLIED HEALTH SCIENCES

Contents

Team for TOS Development		
1.	Mr. ABDUR REHMAN	Director IPMS
2.	Mr. MOHSIN SHAH	Group leader
3.	Miss SHAHRUKH	Subject Specialist KMU-IPMS Peshawar
4.	Miss GHAZAAL	Subject Specialist KMU-IPMS Peshawar
5.	Mr. MUHAMMAD ASIF ZED	Final review
6.	Mr. BABAR ALI	Final review

Vision & Mission

Khyber Medical University (KMU) Vision:

Khyber Medical University will be the global leader in health sciences academics and research for efficient and compassionate health care.

Khyber Medical University (KMU) Mission:

Khyber Medical University aims to promote professional competence through learning and innovation for providing comprehensive quality health care to the nation.

Institute of Paramedical Sciences Peshawar (IPMS-PESH) Mission:

To produce allied health professionals who excel in their skills, research, compassionate care, and community involvement, thereby enhancing the healthcare system

Program Introduction

BS Renal Dialysis program at Khyber Medical University is a comprehensive four-year undergraduate degree designed to equip students with the knowledge, skills, and competencies required to become competent renal dialysis technologists. Renal Dialysis is a vital healthcare profession that focuses on treating and managing Renal Failure. Renal Dialysis technologists work closely with patients, healthcare providers, and other medical professionals to improve patient outcomes.

This Program is structured to provide students with a strong foundation in the sciences and specialized training in Renal Dialysis technology. Students will learn about the principles of Dialysis and the latest techniques and technologies used in Hospitals. Throughout the four-year program, students will participate in clinical rotations and internships at top-tier hospitals and healthcare facilities, where they will gain hands-on experience in patient care and develop the skills necessary to work effectively in a fast-paced healthcare environment. Upon completion of the program, graduates will be eligible to take the American Board of Registration and Certification exam and qualified to work as registered Renal Dialysis technologists.

Objectives

By the end of the BS Renal Dialysis Degree, the students will be able to:

Cognitive Domain

1. Explain the principles of Renal Dialysis & Advantages.
2. Interpret pertinent clinical information to select appropriate treatment procedures for neonatal, pediatric, and adult patients.
3. Identify potential expanded roles for clinical dialysis professionals by examining professional behavior and the history of the field.
4. Discuss the current professional and clinical roles.
5. Apply knowledge of the field to address current or future needs related to renal dialysis practice, administration, education, and/or research

Psychomotor Domain

1. Demonstrate proficiency in using the latest techniques and technologies in renal dialysis technology.
2. Perform patient assessments and deliver high-quality diagnoses in a clinical setting.
3. Effectively communicate with patients, healthcare providers, and other medical professionals using appropriate terminology.
4. Work collaboratively with inter-professional teams to deliver effective, patient-centered diagnosis & care.
5. Develop the skills necessary to work efficiently in a fast-paced healthcare environment.

Affective Domain

1. Exhibit professional behavior and adhere to ethical values in the delivery of clinical Renal dialysis.
2. Incorporate an evidence-based approach to patient care by identifying and accessing appropriate literature and assessing relevant medical research.
3. Demonstrate leadership skills in the Renal dialysis profession, healthcare, and the community.
4. Engage in continuous learning and professional development to stay current with the latest advancements in the field of renal dialysis.
5. Provide compassionate and patient-centered care that respects the dignity and autonomy of each individual

Sixth Semester Subjects for BS Renal Dialysis Technology

S. No	Subjects	Duration
1	RDT-613 Urological Procedure I Credit Hours 3 (2+1)	16 weeks
2	RDT-609 Chronic Complication II Credit Hours 3 (2+1)	16 weeks
3	RDT-612 Dialysis Adequacy Credit Hours 3(2+1)	16 weeks
4	RDT- 614 Renal Pharmacology Credit Hours 3(2+1)	16 weeks
5	RDT-610 Dialysis in special situation Credit Hours 3(2+1)	16 weeks
6	RDT- 611 Complication of peritoneal dialysis Credit Hours 3(2+1)	16 weeks

TOS 6TH Semester

BS Renal Dialysis Technology

Subjects:

1. Dialysis in special situations
2. Dialysis adequacy
3. Renal pharmacology
4. Complications of peritoneal dialysis
5. Urological procedure I
6. Chronic complications of hemodialysis

SUBJECT: DIALYSIS IN SPECIAL SITUATION 3(2+1)

S.No	Weeks	Contents	Learning Outcome	Domain			MIT's	Time/Hours	Assessment	No of Items
				C	P	A				
TOPIC: MANAGING DIABETIC PATIENTS ON DIALYSIS										
1	Week-1	Introduction	Introduction to diabetes in renal failure patient	C1			CBL/SGD	2	MCQs	6
2		Diabetes types	Identify the Types of Diabetes Common in dialysis patients	C1						
3		Non-renal complications	Enlist the Non-Renal Complication of diabetic patient	C2						
4		Initiation of dialysis	Explain the rate of glomerular filtration in diabetic patients to start dialysis	C2						
5		Choice of modality	Describe the preferred modality in diabetic dialysis patient	C3						
6		Transplant	Discuss the outcome of transplant in dialysis patients having diabetes	C2						

7		Practical	Operating Glucometers to Check Blood Sugar Levels		P4		Demo	1	OSPE	1
8		Patient counselling	Counseling of patient to maintain blood sugar level			A4				
TOPIC: PROBLEM FOR DIABETIC PATIENTS ON DIALYSIS										
9	Week-2	Diabetic problems	Enlist Diabetic Problems in dialysis patients	C1			CBL/SGD	2	MCQs	5
10		Gastroparesis	Describe How Gastroparesis Occurs in Diabetic Dialysis Patient	C2						
11		Blood glucose sugar	Discuss Blood Glucose Control Using HbA1C as A measuring Tool as Per KDOQI Guidelines in patients require dialysis	C2						
12		Insulin delivery	Explain Insulin Delivery Both in Hemodialysis and CAPD (Continuous ambulatory peritoneal dialysis) Exchanges	C3						
13		Oral hypoglycemic agent	Explain Oral Hypoglycemic Agents Administration and Contraindications in diabetic renal failure patients	C2						
14		Dialysis related complications	Describe dialysis complications in diabetic patient	C3						
20		Practical	Demonstration of Proper Foot Hygiene to Prevent Complications as Diabetes Can Lead to amputation		P4		Demo	1	OSPE	-
21		Comply to SOPs	Comply sops to control infection rate in diabetic dialysis patient			A4				
TOPIC: SURGERY IN DIALYSIS PATIENT										
22		Introduction	Identify the common surgical procedures performed on Dialysis Patients	C1			CBL/SDG	2	MCQs	5
23		Surgery types	Enlist What Are Surgery Types	C2						

24		Mortality risk	Explain factors of Mortality Risk in Surgery Patient on Dialysis	C3						
25	Week-3	Pre & peri operative monitoring	Discuss The Preoperative Assessment Required for dialysis Patients	C3						
26		Post-operative monitoring	Discuss Post-Operative Monitoring for Dialysis patients	C3						
27		Surgical procedures	Explain Surgical Procedures more common in diabetic dialysis patients	C3						
28		Fluid & electrolytes management	Discuss the importance of fluid and electrolyte management in surgery dialysis patients	C2						
29		Dialysis schedule	Explain modality preferences in surgery dialysis patient	C3						
30		Practical	Interpretation of lab reports in surgery dialysis patients		P4		Demo	1	OSPE	1
31		Patient counselling	Counselling of dialysis patients about restrictions of food before surgery			A4				
TOPIC: MANAGING COMPLICATIONS OF SURGERY IN DIALYSIS PATIENTS										
32		Surgery complications	Enlist complications Associated with surgery in dialysis Patients	C1			CBL/SDG	2	MCQs	5
33		Hyperkalemia	Explain Hyperkalemia Occurrence in Surgery Dialysis Patients	C2						
34		Anemia	Discuss Anemia Mechanism with Management for Surgery Patients	C2						
35	Week-4	Ischemic heart disease	Describe Ischemic Heart Disease & Its Diagnosing Tools Before Surgery In dialysis patients	C3						

36		Bleeding	Explain the Mechanism of Bleeding &Management Agents in Dialysis patients after surgery	C2						
37		Nutrition	Develop a dietary plan for a Surgery patient on dialysis considering their nutritional needs and restrictions	C3						
38		Practical	Video demonstration of dialysis Patient preparation For Surgery (Transplant)		P4		Demo	1	OSPE	1
39		Ethical norms	Maintenance of patient psychological condition undergoing surgery			A4				
TOPIC: MYELOMA RENAL FAILURE										
40	Week-5	Introduction	Introduction to Myeloma Renal failure	C1			CBL/SDG	2	MCQs/SEQs	4
41		Myeloma & acute kidney injury	Identify causes of kidney failure in patients with multiple myeloma	C1						
42		Clinical features	Enlist Clinical Features Associated with myeloma related kidney damage	C1						
43		Pathophysiology	Explain the pathophysiology how multiple myeloma leads to renal failure	C2						
44		Patient monitoring	Develop a monitoring plan for renal failure in a patient undergoing treatment for multiple myeloma	C3						
45		Practical	Demonstration on effectiveness of renal replacement therapy in patients with myeloma renal failure		P4		Demo	1	OSPE	1
46		Comply to SOPs	Implement protocols to wear personal protective			A4	Role Play			

			equipment's (PPE) to ensure worker and patient hygiene							
TOPIC: MYELOMA RENAL FAILURE TREATMENT										
47		Myeloma renal failure treatment	Describe Treatment Regime for Myeloma AKI Patients	C3			CBL/SDG	2	MCQs	6
48		Plasma exchange	Explain Plasma Exchange Process in Multiple Myeloma Kidney Failure patients	C3						
49		Chemotherapy	Enlist Chemotherapeutic Agents for Myeloma Renal failure	C2						
50		Transplant	Discuss The Outcome of Transplant in Myeloma Renal Impair Patients	C2						
51	week 6	Dialysis procedure	Elaborate Dialysis Modality Used for Myeloma Patients	C3						
52		Practical	Interpretation of laboratory reports in myeloma renal failure patient		P4		Demo	1	OSPE	1
		Ethical norms	Maintain ethical norms of myeloma renal failure patient			A4				
TOPIC: PAIN MANAGEMENT IN DIALYSIS PATIENTS										
53		Introduction	Introduction to pain In Dialysis patients	C1			CBL/SDG	2	MCQs	4
54		Incidence rate	Discuss Incidence Rate of Pain In renal failure dialysis dependent patient	C2						
55	Week-7	Etiological factors	Identify common causes of pain in dialysis patients such as muscle cramps and neuropathy	C1						
56		CKD & Pain perception	Explain Impact of chronic kidney disease on pain perception and management	C2						
57		DIALSIS RELATED PAIN	Describe Dialysis Factors Responsible for Causing Pain in	C3						

			Kidney failure patients							
58		PRACTICAL	Video demonstration of patient Pain Levels assessment Using Standardized Pain Scales		P4			1	OSPE	1
59		Comply to SOPs	By adhering to Sops healthcare workers can foster a supportive environment that acknowledges & respects patients feeling and experiences related to pain			A4				
TOPIC: DIFFICULTY OF PAIN MANAGEMENT IN RENAL PATIENT										
60	Week-8	Factors leading difficulty pin management	Identify common challenges faced in managing pain for renal failure patients	C1			CBL /SDG	2	MCQs	3
61		Types of pain	Enlist Types of Pain commonly experienced by patients with Renal failure	C1						
62		Pharmacokinetics of analgesic in renal failure patient	Explain Pharmacokinetics of Analgesic Drugs in End Stage Renal Disease Patients	C2						
63		NSAIDs & Nephrotoxicity	Describe Mechanism of NSAIDS As Nephrotoxic Drugs in Dialysis dependent patients	C2						
64		Clinician factors of poor pain management	Enlist Factors Leading to Poor Pain Management in dialysis Patients	C2						
65		Practical	Demonstrate Correct Dosage Calculation of Analgesic drugs		P4		Demo	1	OSPE	1
		Comply to sops	Comply to sops while analgesic drugs administration in end stage renal disease patient			A4				
TOPIC: ANALGESIC DRUGS IN DIALYSIS PATIENT										
66	Week-9	Introduction	Introduction to Analgesic Drugs in Dialysis patients	C1			CBL/SDG	2	MCQs/SEQs	3
67		Pain management	Describe How to Manage Pain in End stage renal disease	C3						

			Patients							
68		Analgesic prescription	Enlist Analgesic Drugs Prescribed for Renal Failure Patient	C2						
69		Mild pain in dialysis	Discuss Management of Mild Pain in Dialysis Patients	C2						
70		Moderate pain in dialysis	Describe the Management of Moderate Pain in Dialysis Patients	C3						
71		Sever pain in dialysis	Enlist Drugs Used for Sever Pain Management in Renal Failure	C2						
73		Practical	Assessment of severity of pain level in dialysis patients		P4		Demo	2	OSPE	1
74		Informed consent	Take informed consent from dialysis patient			A4				
TOPIC: PREGNANCY IN DIALYSIS PATIENT										
75	Week-10	Introduction	Introduction to Pregnancy in Dialysis Patients	C1			CBL/SDG	2	MCQs/SEQs	4
76		Incidence rate	Discuss the Incidence Rate of Pregnancy on dialysis	C2						
77		Maternal Complications & dialysis Outcome	Explain Maternal Risks and Dialysis Outcome of Pregnancy	C3						
78		Modality preferences	Describe dialysis modality preferences on dialysis	C3						
79		Fetal complications & dialysis outcome	Identify Dialysis and Fetal Outcome of Pregnant Dialysis Women	C1						
80		Diagnosis	Describe Tests to Diagnose Pregnancy in dialysis patients	C3						
81		Practical	Interpretation of laboratory reports of pregnant women on dialysis		P4		Demo	2	OSPE	1
82		Ethical norms	Maintain ethical norms of pregnant women on dialysis			A4				
TOPIC: MANAGING PREGNANCY IN DIALYSIS PATIENT										

83	Week-11	Pregnancy & hemodialysis	Discuss Pregnancy While Performing Hemodialysis Modality	C2			CBL/SDG	2	MCQs/SEQs	5
84		Pregnancy & peritoneal dialysis	Describe Pregnancy Using Peritoneal Dialysis as A Renal Replacement Therapy	C3						
85		Nutrition requirement	Explain Nutritious Diet for Pregnant Women on Dialysis	C3						
86		Hypertension in pregnancy	Explain How to Manage Hypertension in Pregnancy	C3						
87		Infection prevention	Discuss How to Prevent Pregnant Women from Getting Any Sort of Infection	C2						
88		Anemia management	Describe Anemia Management In Pregnant dialysis Women	C3						
89		Pregnancy & renal transplant	Discuss Role of Kidney Transplant After Pregnancy	C2						
90		Practical	Demonstration of renal replacement therapies in pregnant dialysis women		P4		Demo	1	OSPE	1
91		Patient documentation	Maintain Thorough Documentation of All Assessment, Interventions, And Patient Responses Throughout Pregnancy			A4				
TOPIC: DIALYSIS IN HIV PATIENT										
92	Week-12	Introduction	Introduction to Human Immune Deficiency Virus in dialysis patients	C1			CBL/SDG	2	MCQs/SEQs	4
93		Incidence rate	Discuss Incidence Rate of HIV in Dialysis	C2						
94		Modality preferences	Explain Dialysis Modality Preference in HIV Patients	C3						
95		Patient outcome	Describe Outcome of dialysis in human immune deficiency virus	C3						

96		Practical	Interpretation of laboratory tests in HIV patients		P4				Ospe	1
97		Ethical norms	Maintain ethical norms of HIV patient on dialysis			A4				
TOPIC: PLASMAPHERESIS										
98	Week-13	Introduction	Define Plasmapheresis	C1			CBL /SDG	2	MCQs/SEQs	6
99		Indications	Describe Indications of Plasmapheresis	C3						
100		Methods	Enlist Types of Plasmaphereses	C2						
101		Procedure	Illustrate How to Perform Plasmapheresis Procedure	C4						
102		Outcome	Explain the Outcome of the Plasmapheresis Procedure	C3						
103		PRACTICAL	Demonstration on operating Plasmapheresis Machine preparation by checking all components & ensuring it is calibrated Properly		P4				OSPE	1
104		Comply to SOPs	Obtain Informed Consent from The Patients That Clearly Explains Benefits &Potential Risks of Plasmapheresis			A4				
TOPIC: DIALYSIS IN ELDERLY										
105	Week-14	Introduction	Introduction to Dialysis in Elderly Patients	C1			CBL/SDG	2	MCQs/SEQs	3
106		Indications	Enlist The Indications of Dialysis In elderly Patients	C2						
107		Modalities	Describe Dialysis Modalities in Elderly Patients	C3						
108		Quality of life	Discuss Outcome of dialysis in elderly patient	C3						
109		Elderly patient complication	Explain Rate of Complication Occurrence in elderly dialysis required patients	C3						
110		Practical	Demonstrate Dialysis Machine preparation by Checking All		P4		Demo	2	OSPE	1

			Settings and Ensuring Its Functioning Properly							
111		Comply to SOPs	Consideration for Patients Medical History current health status before initiating dialysis			A4	Role Play			
TOPIC: DIALYSIS IN PEADSS										
112	Week-15	Introduction	Introduction to Dialysis in Pead's	C1			CBL/SDG	2	MCQs/SEQs	3
113		Indications	Enlist The Indications of Dialysis In peads	C2						
114		Modalities	Describe Dialysis Modalities in Peads Patients	C3						
115		Quality of life	Discuss Outcome of dialysis in peads	C3						
116		Peads complications	Explain Rate of Complication Occurrence in peads	C3						
117		Practical	Demonstrate vitals of dialysis dependent peads		P4		Demo		OSPE	1
		Follow-up	Encourage the patient to follow dialysis prescribed schedule to balance vitals							
118		**TOPIC: CHILDREN ON DIALYSIS COMPLICATIONS**								
119		Children complications	Introduction to acute and Chronic Complications of Dialysis in Children	C1			CBL/SDG	2	MCQs/ SEQs	5
120		Technical complications	Explain Technical Complications Occurring in Dialysis	C3						
121	Week-16	Access complications	Describe Patient Access & Dialysis Related Complications	C3						
122		Anticoagulation complications	Discuss Heparin Related Complications in dialysis dependent children	C2						
123		Complications management	Explain Management of Acute and Chronic Complications in children on dialysis	C3						

124		Practical	Video demonstration on dialysis procedure along with technical complication		P4		Demo		OSPE	1
		Comply to SOPs	Comply to sops for dialysis procedure			A4				

ASSESSMENT BREAKDOWN				
S.NO	**TOPICS**	**NO OF MCQS**	**OSPE/OSCE STATION**	**STATIC OR INTERACTIVE**
1	DIABETIC PATIENTS ON DIALYSIS	06	1	Static
2	SURGERY IN DIALYSIS PATIENT	05	1	Static
3	MANAGING COMPLICATIONS OF SURGERY IN DIALYSIS PATIENTS	05	1	Static
4	MYELOMA RENAL FAILURE	04	1	Static
5	MYELOMA RENAL FAILURE TREATMENT	05	1	Static
6	PAIN MANAGEMENT IN DIALYSIS PATIENTS	04	1	Static
7	DIFFICULTY OF PAIN MANAGEMENT IN RENAL PATIENT	03	1	Static
8	ANALGESIC DRUGS	03	Nil	Nil
9	PREGNANCY IN DIALYSIS PATIENT	04	1	Static
10	MANAGING PREGNANCY IN DIALYSIS PATIENT	05	1	Static
11	DIALYSIS IN HIV PATIENT	04	1	Static
12	PLASMAPHERIASIS	06	1	Static
13	DIALYSIS IN ELDERLY	03	1	Static
14	DIALYSIS IN PEADS	03	1	Static
15	COMPLICATION OF ACUTE AND CHRONIC DIALYSIS IN CHILDREN	05	1	Static
16	MANAGING DIABETIC PATIENTS ON DIALYSIS	05	Nil	Nil
Total	**16**	**70**	**14**	**14**

Course description

Dialysis In Special Situation Provides an In-Depth Exploration of Dialysis Procedure and Considerations in Unique Clinical Scenarios It Aims to Equip Healthcare Professionals (Students) With the Knowledge and Skills Necessary to Manage Patients Requiring Dialysis Under Special Circumstances such as Those with comorbidities, Pediatric Patients, Pregnancy Patients, HIV, Myeloma Patients and Patients Undergoing Surgical Procedure

Cognitive domain

By the end of study students will able to learn

1. Understanding indications for dialysis such as kidney failure or sever electrolyte imbalance
2. Identifying potential complications occurring in dialysis in special situation
3. Learning about dietary restrictions and fluid management to optimize dialysis outcomes
4. Understanding the importance of analgesic drugs in renal residual function
5. Learning about the significance of monitoring vital signs and laboratory values during and after dialysis session

Psychomotor domain

By the end of study students will able to learn

1. Operating Glucometers to Check Blood Sugar Levels
2. Video demonstration on dialysis procedure along with technical complication
3. Demonstration on Proper Foot Hygiene to Prevent Complications as Diabetes Can Lead to amputation
4. Interpretation of lab reports of surgery dialysis patients
5. Interpretation of laboratory reports of pregnant women on dialysis
6. Interpretation of laboratory reports of pregnant women on dialysis
7. Demonstration on operating Plasmapheresis Machine preparation by checking all components & ensuring it is calibrated Properly
8. Demonstrate Correct Dosage Calculation of Analgesic drugs

Affective domain

SUBJECT: DIALYSIS ADEQUACY 3(2+1)

S.No	Weeks	Contents	Learning Outcome	Domain			MIT's	Time/Hours	Assessment	No of Items
				C	P	A				

By the end of this course, students should be able to

1. Demonstrate punctuality
2. Follow the specified norms of the CBL, SGD teaching & learning effectively
3. Demonstrate humbleness and use socially acceptable language during academic and social interactions with human models, colleagues, and teachers.
4. Demonstrate ethically competent decisions when confronted with an ethical, social, or moral problem in professional or personal life
5. Comply with SOPs of practical & procedure effectively

Recommended Books

1. Handbook of dialysis, John T. Daugaard's, Peter G. Black, Todd, 5th edition
2. Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence,
3. Complication of dialysis, Norbert lame ire, Ravindra L. Metha
4. Oxford Desk Reference Nephrology, Jonatan Barratt, Kevin Harris, Peter Topham

TOPIC: DIALYSIS ADEQUACY OVERVIEW										
1	Week-1	Introduction	Define Dialysis Adequacy	C1			CBL/SGD	2	MCQs	5
2		Epidemiological aspects	Discuss Epidemiological Aspects of Dialysis Adequacy	C2						
3		Hemodialysis outcomes	Enlist The Adequacy Factors To determine Hemodialysis Outcomes	C2						
4		Dialysis adequacy	Explain Dialysis Adequacy	C3						
5		Adequacy assessment	Elaborate Assessment of Hemodialysis Adequacy	C3						
6		Practical	Demonstration of Dialysis Prescription Including Dialysis Frequency, ultrafiltration rate and Duration of Treatments		P4		Demo	1	OSPE	1
7		Patient counselling	Console the patient about maintenance of dialysis adequacy			A4	Role Play			
TOPIC: DIALYSIS ADEQUACY SOLUTE CLEARANCE										
8	Week-2	Introduction	Introduction to Solute Clearance	C1			CBL/SGD	2	MCQs	4
9		Pre dialysis sampling	Discuss Pre-Dialysis sampling for Adequacy Aspects	C2						
10		Post dialysis sampling	Discuss Post Dialysis Sampling for Adequacy Aspects	C2						
11		Uremia assessment	Identify assessment tool for uremia	C2						
12		Solute marker of adequacy	Explain role of Medium and Large Molecule Clearance in dialysis adequacy	C3						
13		NCDS (National cooperative dialysis studies)	Explain National Cooperative Dialysis Study Determinants of Morbidity and Mortality	C3						
14		Practical	Formulate Clearance Using Clearance=Conc in Blood Before Dialysis-Conc in Blood After Dialysis/Conc in Blood Before Dialysis		P4		Demo	1	OSPE	1
15		Patient assessment	Assessment of patient solute clearance			A4				.

TOPIC: UREA KINETIC MODELING										
16		Urea kinetic modelling (UKM)	Define Urea Kinetic Modelling	C1			CBL/SDG	2	MCQs	5
17		Sampling Technique	Enlist Sampling Techniques Used For UKM	C2						
18		Sampling procedure	Identify the Sampling Procedure for Both Catheter and Fistula access	C2						
19	Week-3	Urea generation rate	Discuss urea generation rate	C3						
20		Urea distribution rate	Explain Urea Distribution Process in the body	C3						
21		Urea elimination rate	Describe Urea Elimination Rate and Its importance on Quality of life	C3						
22		Single pool model	Discuss Single-Pool Model	C2						
23		Double pool model	Explain Double-Pool Model	C2						
24		Practical	Interpretation of Blood Samples to Measure level of solute in dialysis patient		P4		Demo	1	OSPE	1
25		Informed consent	Take Informed Consent from Patients Before Taking Blood Sample			A4			OSCE	
TOPIC: CALCULATION OF KT/V										
26		Kt/v(Fractional urea clearance)	Introduction to Kt/v	C1			CBL/SDG	2	MCQs	5
27		UKM & Kt/v	Explain Co-Relation Of UKM & Kt/v	C3						
28	Week-4	Single pool Kt/v	Discuss Single-Pool Kt/v	C2						
29		Daugirdas formula	Explain Adequacy of Dialysis Using Daugirdas Formula	C3						
30		KT/V&URR	Describe Solute Clearance Using Kt/v & URR	C3						
31		EQUILIBRATED KT/V	Explain Dialysis Adequacy by Equilibrated KT/V	C3						
32		KT/V IN AV access	Describe Solute Clearance Using KT/V From Arterio venous Access	C2						
33		KT/V IN VV access	Describe Solute Clearance Using KT/V From Veno venous Access	C2						

34		Practical	Demonstrate value of KT/V to measure Adequacy Standards during dialysis		P4		Demo	1	OSPE	1
35		Follow-up	Encourage the patient to actively follow prescribed dialysis schedule			A4				
TOPIC: MEASURES OF SOLUTE CLEARANCE ONLINE/MANUAL										
36	Week-5	Introduction	Define Solute Clearance	C1			CBL/SDG	2	MCQs/SEQs	4
37		Clearance & time (Kt)	Describe Solute Clearance in Context with Duration of Session	C2						
38		Urea reduction ratio (URR)	Elaborate Urea Reduction Ratio After Hemodialysis Procedure	C3						
39		Solute removal index	Explain Solute Removal Index	C3						
40		Quantification of clearance in HDF	Describe Quantification of Clearance In Hemodiafiltration	C3						
41		Online urea sensor	Explain Online Urea Sensor to Measure Urea Removal Rate	C3						
42		Measurement of ions	Explain Measurement of Ionic Dialysance to Identify Adequacy	C3						
43		Ultraviolet rays' measurement	Discuss Measurement of Ultraviolet Absorbance	C2						
44		Practical	Demonstrate Pre-Dialysis Blood Sample to Measure Urea Nitrogen Level		P4		Video Demonstration	1	OSPE	1
45		Documentation	Keep Accurate Records of Solute Measurements and Calculations			A4	Role Play			
TOPIC: RESIDUAL RENAL FUNCTION										
46		Residual renal function (RRF)	Define Residual Renal Function	C1			CBL/SDG	2	MCQs	5
47		Residual renal urea clearance	Describe Renal Residual Clearance Using Kru Formula	C2						
48		Clearance w/o RRF	Explain Dialysis Adequacy Calculating KT/V With No Residual Function	C3						
49		Two session RRF formula	Explain Renal Residual Function for A Patient Receiving Only Two Session of Dialysis	C3						

50	week 6	Data collection	Discuss Data Collection Procedure to Specify Renal Residual Function	C3						
52		Practical	Demonstrate renal residual function of dialysis patient		P4		Demo	1	OSPE	1
53		Patient counselling	Counselling the patient about the maintenance of renal residual function			A4				
TOPIC: OTHER MARKERS OF ADEQUACY										
53		Adequacy markers	Introduction to Adequacy Markers	C1			CBL/SDG	2	MCQs	5
54		Ultrafiltration	Explain role of ultrafiltration in dialysis adequacy	C3						
55	Week-7	Malnutrition	Describe Malnutrition as Marker of Dialysis Adequacy	C2						
56		Hemodialysis product (HDP)	Explain Hemodialysis Product Also Specify HDP Formula	C3						
57		Protein catabolic rate (PCR)	Discuss Protein Catabolic Rate and Calculate Its Formula	C3						
58		Practical	Demonstration of malnutrition and protein catabolic rate		P2			1	OSPE	-
59		Patient counselling	Patient counselling about protein catabolic rate maintenance			A4				
TOPIC: TARGET OF ADEQUATE DIALYSIS KT/V AND UREA REDUCTION RATIO										
60	Week-8	Introduction	Define Urea Reduction Ratio	C1			CBL/SDG	2	MCQs	4
61		Adequate dialysis target	Explain Targets Of Adequate Dialysis	C2						
62		Actual Kt/v	Describe Actual KT/V	C2						
63		Delivered Kt/v	Describe Delivered KT/V	C2						
64		KDOQI minimum & suggested Kt/v	Elaborate The Minimum& Suggested Target For KT/V According to KDOQI Guidelines	C3						
65		UK renal association minimum & suggested Kt/v	Explain The Minimum& Suggested Target For KT/V With Reference to UK Renal Association	C3						
66		European best practices guidelines	Illustrate The Minimum& Suggested Target For KT/V According to	C3						

			European Best Practices Guidelines							
67		Practical	Demonstration of urea reduction ratio in dialysis		P4		Demo	1	OSPE	1
		Ethical norms	Maintain ethical norms of renal failure patient via assessing urea reduction ratio			A4				
TOPIC: INCREASING DIALYSIS DOSE DELIVERED										
68	Week-9	Introduction	Introduction to Dialysis Dose	C1			CBL/SDG	2	MCQs/SEQs	4
69		Lower fractional urea clearance	Describe How Delivered KT/V is Lower Than Expected	C2						
70		Increasing dialyzer surface area (Koa)	Discuss Role of Increasing Surface Area in Dialysis Adequacy	C2						
71		Increasing blood flow rate	Explain Effect of Increased Blood Flow Rate on Adequacy	C3						
72		Increasing dialysis dose	Describe The Impact of Increased Dialysis Dose on Dialysis Adequacy	C3						
73		Modality preferences	Explain How Change in Modality Is Associated with Better Solute Clearance	C3						
74		Hemofiltration	Explain Hemodiafiltration	C2						
75		Practical	Operating dialysis parameters to increased delivered dialysis clearance		P4		Demo	2	OSPE	1
76		Comply To SOPS	Comply to SOPs when operating dialysis machine			A4				
TOPIC: DIALYSIS ADEQUACY IN ACUTE RENAL FAILURE										
77	Week-10	Introduction	Define Acute Renal Failure	C1			CBL/SDG	2	MCQs/SEQs	4
78		Indications	Describe Indications of Dialysis In ARF	C2						
79		Access preferences	Explain preferred access in Acute Renal Failure Patient	C3						
80		Suggested modalities	Discuss Preferred modalities In Acute renal failure patient	C2						
81		Patient assessment	Explain acute renal failure patient assessment	C3						
82		Complications	Describe Rate of Complication Occurrence In Acute Renal Failure	C3						

83		Adequacy tool for AKI	Identify Adequacy Measuring Tools for Acute Renal Failure Patient	C3						
84		Practical	Demonstrate Dialysis procedure in acute kidney injury patient		P4		Demo	2	OSPE	1
		Sops	Comply to sops for performing dialysis procedure			A4				
TOPIC: PRESCRBING CHRONIC HEMODIALYSIS UREA CLEARANCE										
85	Week-11	Introduction	Define Dialysis Prescription	C1			CBL/SDG	2	MCQs/SEQs	4
86		Urea clearance	Explain Urea Clearance of A Patient Receiving Routine Dialysis	C3						
87		Deliver dialysis lower rate	Discuss Reasons for Low Delivered Dialysis Clearance Than Expected	C2						
88		Number of sessions	Describe Number of Session Suggested for Chronic Hemodialysis	C3						
89		Procedure duration	Elaborate How Much Procedure Duration It Would Be on Chronic Hemodialysis	C3						
90		Blood flow rates	Discuss Blood Flow Rates of Chronic Hemodialysis	C2						
91		Complication rate	Elaborate Chronic Hemodialysis Complication Related to Procedure	C3						
92		Adequacy in CKD	Illustrate The Adequacy of Patient Receiving Chronic Hemodialysis	C3						
93		Practical	Demonstration on patient prescription for chronic hemodialysis		P4		Demo	1	OSPE	1
		Comply to Sops	Comply to sops for patient prescription for chronic hemodialysis			A4				
TOPIC: PRESCRIBING CHRONIC HEMODIALYSIS DIALYSER FACTOR										
94	Week-12	Introduction	Introduction to Dialyzer	C1			CBL/SDG	2	MCQs/SEQs	4
95		Dialyzer surface area (koa)	Explain Surface Area of Dialyzer and Its Effect on Solute Clearance	C3						
96		Dialyzer size	Discuss Size and Types of Dialyzers	C2						
97		Dialyzer membrane	Describe Dialyzer Membrane and Its	C3						

			Impact on Dialysis Adequacy							
98		Ultrafiltration rate	Explain Rate of Ultrafiltration in Routine Dialysis Patient	C3						
99		Dialysate	Elaborate Dialysis Solution and Variation Of Dialysate Composition	C3						
100		Anticoagulation	Illustrate Anticoagulation Mechanisms Agents& Administration Method	C3						
101		Practical	Interpretation of Dialyzer Clearance via small solute Clearance Test		P4				OSPE	2
102		Comply to SOPs	Comply to SOPS for Priming the dialyzer correctly			A4				
TOPIC: LABORTATORY TEST FOR PATIENT ON REGULAR HEMODIALYSIS										
103	Week-13	Introduction	Define Laboratory Routine Tests	C1			CBL/SDG	2	MCQs/SEQs	5
104		Urine analysis	Explain Urine Analysis	C3						
105		Complete blood count(CBC)	Describe Complete Blood Count Test and Suggested Values for Hemodialysis Patients	C3						
106		PTH	Discuss How to Measure PTH As a Marker of Morbidity	C2						
107		CRP(C-Reactive protein)	Describe CRP	C2						
108		Ferritin iron & transferrin saturation	Illustrate Ferritin Iron Transferrin Saturation	C3						
109		Liver function test	Explain Liver Function Test	C3						
110		Virology	Elaborate Virology and Identification Of Blood Born Viruses	C3						
111		Cytotoxic antibodies	Illustrate Cytotoxic Antibodies Production	C4						
112		Practical	Interpretation of laboratory test of patient on regular dialysis		P4				OSPE	2
113		Ethical Norms	Maintain ethical norms of dialysis dependent patient							
TOPIC: DRY WEIGHT / NOVEL MEASURE OF DRY WEIGHT										

114	Week-14	Introduction	Define Dry Weight	C1			CBL/SDG	2	MCQs/SEQs	4
115		Clinical assessment	Explain How to Assess Patient Dry Weight	C2						
116		Serum atrial natriatic peptide	Describe Serum Arterial Natriatic Peptide Method For Dry Weight	C3						
117		Vena cava diameter	Elaborate Dry Weight from Vena Cava Diameter	C3						
118		Bio impedance	Discuss Bio impedance for Dry Weight Assessment	C2						
119		BVM	Describe BVM And Assess Dry Weight	C2						
120		Practical	Demonstration of patient dry weight in dialysis		P4		Demo	2	OSPE	1
121		Informed consent	Take informed consent from dialysis patient			A4	Role Play			
TOPIC: REUSE DIALYSER/TECHNIQUES										
122	Week-15	Introduction	Define Reuse Dialyzer	C1			Interactive Lecture/SDG	2	MCQs/SEQs	5
123		Contraindication	Describe Contraindications of Reuse Dialyzer	C2						
124		Recommendations	Explain When to Use Reuse Dialyzer	C3						
125		Advantages & disadvantages of dialyzer reuse	Elaborate The Advantages &Disadvantages Of Reuse Dialyzer	C3						
126		Manual method	Describe How to Process Dialyzer for Reuse Manually	C2						
127		Automated method	Explain Reuse of Dialyzer Using Automated Method	C3						
128		Dialyzer testing	Illustrate How To Test Dialyzer Reuse After Processing	C3						
129		Practical	Assessment of cleaning process of dialyzer for reuse		P4		Demo		OSPE	1
130		Comply To SOPS	Regularly review The Sops for Processing Dialyzer for Reuse							
131			**TOPIC: POTENTIAL PROBLEMS OF REUSE DIALYSER**							

132		Introduction	Define Technical Problems of Dialyzer	C1			CBL/SDG	2	MCQs	3
133		Infection	Explain How Reuse Dialyzer Is Responsible for Causing Infection	C3						
134	Week-16	Inadequate dialysis	Describe Effect of Reuse Dialyzer on Adequacy of Dialysis	C2						-
135		Dialyzer processing	Elaborate Technical Problems Occurring in Processing Dialyzer for Reuse	C3						
136		Patient complications	Illustrate Rate of Complications Patient Face After Using Reuse Dialyzer	C3						
137		Practical	Video demonstration of dialyzer reuse and sterilization procedure		P4		Demo		OSPE	-
138		Comply to Sops	Comply to sops for dialyzer reuse and sterilization process effectively			A4				

Assessment Breakdown				
S.No	**TOPICS**	**NO OF MCQs**	**OSPE/OSCE STATIONS**	**INTERACTIVE OR STATIC**
1	DIALYSIS ADEQUACY OVERVIEW	05	1	Static
2	DIALYSIS ADEQUACY SOLUTE CLEARANCE	04	1	Static
3	UREA KINETIC MODELING	05	2	Static
4	CALCULATION OF KT/V	05	1	Static
5	MEASURES OF SOLUTE CLEARANCE ONLINE/MANUAL	04	1	Static
6	RESIDUAL RENAL FUNCTION	05	1	Static
7	OTHER MARKERS OF ADEQUACY	05	Nil	Nil
8	TARGET OF ADEQUATE DIALYSIS KT/V AND UREA REDUCTION RATIO	04	1	Static
9	INCREASING DIALYSIS DOSE DELIVERED	04	1	Static
10	DIALYSIS ADEQUACY IN ACUTE RENAL FAILURE	04	1	Static
11	PRESCRBING CHRONIC HEMODIALYSIS UREA CLEARANCE	04	1	Static
12	PRESCRIBING CHRONIC HEMODIALYSIS DIALYSER FACTOR	04	2	Static
13	LABORTATORY TEST FOR PATIENT ON REGULAR HEMODIALYSIS	05	1	Static
14	DRY WEIGHT / NOVEL MEASURE OF DRY WEIGHT	04	1	Static
15	REUSE DIALYSER/TECHNIQUES	05	1	Static
16	POTENTIAL PROBLEMS OF REUSE DIALYSER	03	Nil	Nil
Total	**16**	**70**	**14**	**14**

Course description

Dialysis Adequacy Is a Critical subject in nephrology that focuses on evaluating the effectiveness of daily dialysis treatment in patients with kidney failure The course On Adequacy Covers the Fundamental Concepts and Clinical Practices Related to Assessing the Adequacy of Dialysis Therapies This Course Is Essential For (Students) Healthcare Professionals Involved in Renal Care as It Equips Them with Knowledge and Skills to Optimize Dialysis Treatment and Improve Patient Outcomes

Cognitive domain

By the end of this course, students should be able to

1. Grasp the basic concept of how dialysis works, including the process of diffusion, osmosis and ultrafiltration
2. Recognize key parameters such as kt/v, Urea reduction ratio (URR), and serum creatinine levels that are used to evaluate the effectiveness of dialysis treatment
3. Assess individual patient characteristics, including age, comorbidities, and residual renal function, that may influence dialysis adequacy
4. Compare and contrast different dialysis modalities (e.g. hemodialysis vs. peritoneal dialysis) and their implication for achieving adequate dialysis
5. Continuously monitor patient responses to dialysis and make necessary adjustments to treatment protocols to optimize dialysis adequacy

Psychomotor domain

By the end of this course, students should be able to

1. Demonstration of Dialysis Prescription Including Dialysis Frequency, ultrafiltration rate and Duration of Treatments

2. Formulate solute Clearance Using Clearance=Conc in Blood Before Dialysis-Conc in Blood After Dialysis/Conc in Blood Before Dialysis
3. Interpretation of Blood Samples to Measure level of solute in dialysis patient
4. Demonstrate value of KT/V to measure Adequacy Standards during dialysis
5. Assessment of cleaning process of dialyzer for reuse
6. Video demonstration of dialyzer reuse and sterilization procedure
7. Interpretation of Dialyzer Clearance via small solute Clearance Test
8. Demonstrate Dialysis procedure in acute kidney injury patient
9. Interpretation of laboratory test to calculate adequacy standards in dialysis

Affective domain

By the end of this course, students should be able to

1. Follow the specified norms of the CBL and SGD teaching and learning
2. Demonstrate the humbleness and use the socially acceptable langue during academic and social interaction with patients
3. Demonstrate ethically competent decisions when confronted with an ethical social or moral problems in professional or personal life

Recommended books

1. Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence
2. Handbook of dialysis, John T. Daugirdas, Peter G. Black, Todd, 5th edition

SUBJECT: RENAL PHARMACOLOGY 3(2+1) RDT-614

S.No	Weeks	Contents	Learning Outcome	Domain			MIT's	Time/Hours	Assessment	No of Items
				C	P	A				
TOPIC: DRUGS HANDLING IN RENAL FAILURE										
1	Week-1	INTRODUCTION	Define Drugs	C1			Interactive Lecture/SGD	2	MCQs	5
2		PHARMACOKINETICS	Describe the Pharmacokinetics of Drugs in Renal Failure Patient	C2						
3		PHARMACODYNAMICS	Discuss Pharmacokinetics of Drugs in ESRD Patient	C2						
4		ROUTES OF ADMINISTRATION	Explain Routes of Drugs Administration	C3						
5		DOSE MANAGEMENT IN RENAL FAILURE	Elaborate Dose Management of Drugs in Renal Failure Patients	C3						
6		Practical	Assess Renal Failure Patient Before Drugs Prescription to Avoid Toxicity		P4		Demo	1	OSPE	1
7		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: ANTIMICROBIAL										
9	Week-2	INTRODUCTION	Define Antimicrobial Agents	C1			Interactive Lecture/SGD	2	MCQs	3
10		MECHANISM OF ACTION	Explain Mechanism of Action of Antimicrobial Drugs	C3						
11		DOSING	Discuss How to Do Dose Management Of Antimicrobial Drugs In ESRD Patients	C2						

12		SIDE EFFECTS	Elaborate Side effects Occurrence as Result Of Antimicrobial Drug In Renal Failure Patient	C3						
13		CONTRAINDICATIONS	Describe Contraindications of Antimicrobial Agents In CKD Patients	C3						
14		Practical	Evaluation Of Antimicrobial Programs in Health Care Facilities		P4		Demo	1	OSPE	1
15		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: ANTIFUNGL										
16	Week-3	INTRODUCTION	Define Antifungal Agents	C1			Interactive Lecture/SDG	2	MCQs	5
17		MECHANISM OF ACTION	Explain Mechanism of Action of Antifungal Drugs	C3						
18		DOSING	Discuss How to Do Dose Management of Antifungal Drugs in ESRD Patients	C2						
19		SIDE EFFECTS	Elaborate Side Effects Occurrence as Result of Antifungal Drug in Renal Failure Patient	C3						
20		CONTRAINDICATIONS	Describe Contraindications of Antifungal Agents in CKD Patients	C3						
21		Practical	Assess Fungal Infection on Exit Site		P4		Demo	1	OSPE	1
22		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: ANTITUBERCLOSIS										
23	Week-4	INTRODUCTION	Define Antituberculosis Agents	C1			Interactive Lecture/SDG	2	MCQs	7
24		MECHANISM OF ACTION	Explain Mechanism of Action Of Antituberculosis Drugs	C3						
25		DOSING	Discuss How to Do Dose Management Of Antituberculosis Drugs In ESRD Patients	C2						

26		SIDE EFFECTS	Elaborate Side Effects Occurrence as Result of Antituberculosis Drug In Renal Failure Patient	C3						
27		CONTRAINDICATIONS	Describe Contraindications of Antituberculosis Agents In CKD Patients	C3						
28		Practical	Education the patient about importance of completing full course of antituberculosis therapy		P4		Demo	1	OSPE	1
29		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: OPIOD ANALGESIC										
30	Week-5	INTRODUCTION	Define Opioid Analgesic	C1			Interactive Lecture/SDG	2	MCQs/SEQs	6
31		MECHANISM OF ACTION	Explain Mechanism of Action of Opioid Analgesic	C3						
32		DOSING	Discuss How to Do Dose Management of Analgesics In ESRD Patients	C2						
33		SIDE EFFECTS	Elaborate Side effects Occurrence As Result Of Opioid Analgesic In Renal Failure Patient	C3						
34		CONTRAINDICATIONS	Describe Contraindications of Opioid Analgesic In CKD Patients	C3						
35		Practical	Assessment Of Patient Before Prescribing Opioids According To W.H.O Ladder		P4		Video Demonstration	1	OSPE	1
36		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: CARDIOVASCULAR DRUGS										
37		INTRODUCTION	Define Opioid Analgesic	C1			Interactive Lecture/S	2	MCQs	8
38		MECHANISM OF ACTION	Explain Mechanism of Action of Opioid Analgesic	C3						

39	week -6	DOSING	Discuss How to Do Dose Management Of Analgesics In ESRD Patients	C2			DG			
40		SIDE EFFECTS	Elaborate Side Effects Occurrence as Result Of Opioid Analgesic In Renal Failure Patient	C3						
41		CONTRAINDICATIONS	Describe Contraindications of Opioid Analgesic In CKD Patients	C3						
42		Practical	Understanding Pharmacokinetics and Thermodynamics for Antihypertensive Drugs		P4		Demo	1	OSPE	1
43		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: DRUGS NOT REQUIRED DOSAGE ALTERATION										
44	Week- 7	DRUGS	Define Drugs	C1			Interactive Lecture/SDG	2	MCQs	3
45		DRUGS DOSING	Explain the Dosing Of Drugs That Is Needed In Renal Failure Patient	C3						
46		DRUGS NOT REQUIRED DOSE ALTERATION	Enlist Drugs that Do Not Required Dose Alteration	C2						
47		ADVERSE EFFECTS	Illustrate Adverse Effect Of Drugs In AKI Patients	C4						
48		Practical	Calculation of doses of some important drugs		P2			1		
49		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: DRUGS AVOIDED IN RENAL FALIURE HEMODIALISIS										
50	Week-8	HEMODIALYSIS	Define Hemodialysis Modality	C1			Interactive Lecture/SDG	2	MCQs	5
51		PRESCRIBED MEDICATIONS	Elaborate Medications that Would be Prescribed In Hemodialysis Patients	C3						
52		AVOIDED DRUGS	Enlist Drugs That Are Contraindicated In Hemodialysis Renal Failure Patient	C2						

52		PATIENT OUTCOME	Describe the Role Of Drugs And Patient Outcomes In Hemodialysis	C3						
53		Practical	visit of the nephrology ward and dialysis		P4		Demo	1	OSPE	1
TOPIC: DRUGS AVOIDED IN RENAL FALIURE PERITONEAL DIALYSIS										
54	Week-9	PERITONEAL DIALYSIS	Define Peritoneal Dialysis as Renal Replacement Therapy	C1			Interactive Lecture/SDG	2	MCQs/SEQs	4
55		RESIDUAL RENAL FUNCTION	Discuss Renal Residual Function In PD Patients	C2						
56		PRESCRIBED MEDICATIONS	Elaborate Medications that Would be Prescribed in Hemodialysis Patients	C3						
57		AVOIDED DRUGS	Enlist Drugs That Are Contraindicated in Hemodialysis Renal Failure Patient	C2						
58		PATIENT OUTCOME	Describe the Role of Drugs and Patient Outcomes In Hemodialysis	C3						
59		practical	Understanding of drugs avoided in peritoneal dialysis		P4		Demo	2	OSPE	-
60		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: DOSE ADJUSMENT&METHOD OF DOSE ADJUSTMENT										
61	Week-10	DOSE ADJUSTMENT	Define Dose Adjustment	C1			Interactive Lecture/SDG	2	MCQs/SEQs	4
62		METHOD OF DOSE ADJUSTMENT	Explain Methods Used for Drugs Dose Adjustments	C3						
63		DOSING IN RENAL FAILURE PATIENT	Describe What Are Dosing Techniques for Renal Failure Patients	C2						
64		AFFECT ON QUALITY OF LIFE	Illustrate Effect of Dose Adjustment On Quality Of Life	C4						

65		Practical	Education Patients on the risks of over-the-counter medications in renal failure		P4		Demo	2	OSPE	1
TOPIC: DRUG-INDUCED KIDNEY DISEASE										
66	Week-11	KIDNEY DISEASE	Define Kidney Disease	C1			Interactive Lecture/SDG	2	MCQs/SEQs	5
67		ETIOLOGICAL FACTORS	Describe Etiological Factors That Lead to Kidney Diseases	C3						
68		INCIDENCE RATE	Discuss Incidence Rate Of Kidney Diseases Per Year	C2						
69		SEVERITY OF DISEASE	Explain the Severity of Disease and Drugs' Effect On Survival	C3						
70		DRUGS INDUCED KIDNEY FAILURE	Elaborate Drugs Induced Kidney Failure	C3						
71		Practical	Strategy for preventing drug-induced kidney disease in a high-risk population		P4		Demo	1	OSPE	1
TOPIC: MECHANISM&PRECAUTIONS										
72	Week-12	KIDNEY DISEASE MECHANISM	Describe Mechanism of How Drugs Leads To Loss Of Kidney Function	C3			Interactive Lecture/SDG	2	MCQs/SEQs	2
73		RESPONSIBLE DRUGS	Enlist Responsible Drugs For Kidney Diseases	C2						
74		DISEASE PRECAUTIONS	Discuss Preventive Measures of Drugs-Induced Kidney Diseases	C2						
75		PATIENT OUTCOME	Explain Patient Outcomes After Taking Preventive measures	C3						
76		Practical	Analyzing Case Studies of drug-induced kidney disease					1	OSPE	1
77		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: DIURETICS										

78	Week-13	INTRODUCTION	Define Diuretics	C1			Interactive Lecture/SDG	2	MCQs/SEQs	3
79		MECHANISM OF ACTION	Explain the Mechanism of Action of Diuretics	C3						
80		DOSING	Discuss How to Do Dose Management of Diuretics In ESRD Patient	C2						
81		SIDE EFFECTS	Elaborate Side Effects Occurrence as Result of Diuretics In Renal Failure Patient	C3						
82		CONTRAINDICATIONS	Describe Contraindications of Diuretics in CKD Patients	C3						
83		Practical	Assess the impact of diuretics on metabolic parameters		P4			1	OSPE	1
84		SOPs compliance	Adopt how to take care of chart			A4				
TOPIC: DRUGS USED FOR UTI										
85	Week-14	INTRODUCTION	Define Urinary Tract Infection	C1			Interactive Lecture/SDG	2	MCQs/SEQs	2
86		MECHANISM OF ACTION	Explain Mechanism of Action Of Drugs Used For UTI	C3						
87		DOSING	Discuss How to Do Dose Management of UTI Drugs In ESRD Patients	C2						
88		SIDE EFFECTS	Elaborate Side Effects Occurrence as Result of UTI Drugs In Renal Failure Patient	C3						
89		CONTRAINDICATIONS	Describe Contraindications of UTI Drugs in CKD Patients	C3						
90		Practical	Educating patients regarding UTI Prevention Technique		P4		Demo	1	OSPE	1
91		SOPs compliance	Adopt how to take care of chart			A4	Role Play			

TOPIC: ANTIBACTERIAL DRUGS										
92	Week-15	INTRODUCTION	Define Antibacterial Drugs	C1			Interactive Lecture/SDG	2	MCQs/SEQs	2
93		MECHANISM OF ACTION	Explain Mechanism of Action of Antibacterial Drugs	C3						
94		DOSING	Discuss How to Do Dose Management of Antibacterial Drugs in ESRD Patients	C2						
95		SIDE EFFECTS	Elaborate Side Effects Occurrence as Result of Antibacterial Drugs in Renal Failure Patient	C3						
96		CONTRAINDICATIONS	Describe Contraindications of Antibacterial Agents in CKD Patients	C3						
97		Practical	Examine Swab Collection from Catheter Infection Site		P4		Demo	1	OSPE	1
98		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
	TOPIC: Bacterial Resistance									
99		INTRODUCTION	Define Bacterial Resistance	C1			Interactive Lecture/SDG			
100		RESISTANCES CAUSES	Explain Factors that are Responsible for Causing Bacterial Resistance	C3						
101	Week-16	IDENTIFICATIONS	Describe How to Identify Bacterial Resistance	C3				2	MCQs/SEQs	6
102		DRUGS ALTERNATIVES	Enlist Drugs that Are Used as Alternatives After Bacterial Resistance	C2						
103		Practical	Exploring Different Types of Resistance in ESRD Patients		P4		Demo	1	OSPE	1
104		SOPs compliance	Adopt how to take care of chart			A4	Role Play			

ASSESSMENT BREAKDOWN				
S.NO	Topics	No of MCQS	NO of OSPE/OSCE Station	Static/Interactive

1.	**DRUGS HANDLING IN RENAL FAILURE**	5	1	Static
2.	**ANTIMICROBIAL**	3	1	Static
3.	**ANTIFUNGAL**	5	1	Interactive
4.	**ANTITUBERCULOSIS**	7	1	Static
5.	**OPIOD ANALGESIC**	6	1	Static
6.	**CARDIOVASCULAR DRUGS**	8	1	Static
7.	**DRUGS NOT REQUIRED DOSAGE ALTERATION**	3		Static
8.	**DRUGS AVOIDED IN RENAL FAILURE HEMODIALYSIS**	5	1	Static
9.	**DRUGS AVOIDED IN RENAL FAILURE PERITONEAL DIALYSIS**	4		Static
10.	**DOSE ADJUSMENT&METHOD OF DOSE ADJUSTMENT**	4	1	Static
11.	**DRUG-INDUCED KIDNEY DISEASE**	5	1	Static
12.	**MECHANISM&PRECAUTIONS**	2	1	Static
13.	**DIURETICS**	3	1	Static
14.	**DRUGS USED FOR UTI**	2	1	Static
15.	**ANTIBACTERIAL DRUGS**	2	1	Static
16.	**Bacterial Resistance**	6	1	Static
Total	**16**	70	14	14

Recommended Books:

1. Lippincott's pharmacology (text book) by Mycek 2ndEdition published by Lippincott Raven 2000.
2. Katzung textbook of pharmacology (Reference Book) by Bertram Katzung 8th Edition, Published by Appleton.dec 2007.

cognitive domain:

1. Define and explain the mechanisms of action of different classes of medications used in renal pharmacology.

2. Identify the indications, contraindications, and potential side effects of medications used in renal pharmacology.

3. Explain the pharmacokinetics and pharmacodynamics of medications used in renal pharmacology, including absorption distribution, metabolism, and excretion.

4. Discuss the role of medication therapy in the management of various renal diseases and disorders.

Course Description:

This comprehensive course provides an in-depth review of the

principles and practices of renal pharmacology, focusing on the

pharmacy logical management of renal diseases and disorders.

Students will learn about the pharmacokinetics and pharmacodynamics

of medications used in renal pharmacology, as well as their indications, contraindications, and potential side effects.

Psychomotor domain:

1. Demonstrate proper technique for administering medications to patients with renal disease, including oral, intravenous, and subcutaneous routes.

2. Show proficiency in using renal pharmacology-related equipment, such as medication pumps and infusion devices.

3. Demonstrate the correct procedure for monitoring patients for signs of medication toxicity or adverse effects, such as nephrotoxicity. 4. 4. Perform a thorough assessment of a patient's medication regimen, including identifying potential drug interactions and contraindications.

Affective domain:

1. Demonstrate a commitment to staying up-to-date with the latest evidence-based practices in renal pharmacology. 2. Show empathy and understanding towards patients with renal disease, including their physical, emotional, and social challenges.

3. Develop a positive attitude towards the importance of medication adherence and patient education in renal pharmacology.

4. Recognize the importance of interprofessional collaboration in optimizing medication therapy for patients with renal disease.

SUBJECT: COMPLICATION OF PERITONEAL DIALYSIS 3(2+1) RDT-611

S.No	Weeks	Contents	Learning Outcome	Domain			MIT's	Time/ Hours	Assessment	No of Items
				C	P	A				
TOPIC: Malfunctioning catheter										
1	Week-1	introduction	Introduction to the malfunctioning catheter	C1			Interactive Lecture/SGD	2	MCQs	5
2		types	Discuss types of malfunctioning catheter	C2						
3		Complications of a Malfunctioning Catheter	Explain Complications of a Malfunctioning Catheter	C3						
4		Troubleshooting Steps	Describe Troubleshooting Steps	C3						
5		Prevention Strategies	Elaborate Prevention Strategies of malfunctioning catheter	C3						

6		Practical	Assess malfunctioning catheter sites		P4		Demo	1	OSPE	1
7		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: Constipation in PD Patients										
8	Week-2	INTRODUCTION	Define constipation in PD patient	C1			Interactive Lecture/SGD	2	MCQs	3
9		Causes of Constipation in PD Patients	Discuss Causes of Constipation in PD Patients	C3						
10		Symptoms of Constipation in PD Patients	Describe Symptoms of Constipation in PD Patients	C3						
11		Management of Constipation in PD Patients	Describe Management of Constipation in PD Patients	C3						
12		Prevention of Constipation in PD Patients	Elaborate prevention of Constipation in PD Patients	C3						
13		Practical	Examination Of abdominal x-rays		P4		Demo	1	OSPE	1
14		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: Repositioning peritoneal dialysis catheters										
15		INTRODUCTION	Introduction to repositioning peritoneal dialysis catheters	C1			Interactive Lecture/SDG	2	MCQs	7
16		Pre-Procedure Preparation	Discuss Pre-Procedure Preparation	C3						
17		Repositioning Techniques	Describe Repositioning Techniques	C2						
18	week-3	Indications for Repositioning	Elaborate Indications for Repositioning	C3						
19		Contraindications	Discuss Contraindications of repositioning peritoneal dialysis catheter	C3						
20		Practical	To Assess the site of repositioning PD catheter		P4		Demo	1	OSPE	1

21		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: peritoneal dialysate problem with lactate/ dextrose										
22		INTRODUCTION	Introduction to peritoneal dialysate problem with lactate/ dextrose	C1			Interactive Lecture/SDG	2	MCQs	5
23		Lactate-Related Problems	Discuss Lactate-Related Problems	C3						
24	Week-4	Dextrose-Related Problems	Discuss Dextrose-Related Problems	C3						
25		complications	Describe the complication of peritoneal dialysate problem with lactate/ dextrose	C3						
26		Management	Discuss the Management Strategies	C2						
27		Practical	Demonstrate peritoneal dialysate problem with lactate/ dextrose		P4		Demo	1	OSPE	1
28		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: Peritonitis										
29	Week-5	INTRODUCTION	Define Peritonitis	C1			Interactive Lecture/SDG	2	MCQs/SEQs	6
30		Incidence of peritonitis	Discuss the incidence of peritonitis	C2						
31		Pathogenesis	Explain pathogenesis of peritonitis	C3						
32		Etiology	Describe etiology of peritonitis	C3						
33		Treatment of initial management of peritonitis	Discuss treatment of initial management of peritonitis	C3						
34		Practical	Imaging studies in the diagnosis of peritonitis		P4		Video Demonstration	1	OSPE	1
35		SOPs compliance	Adopt how to take care of chart			A4	Role Play			

TOPIC: Exit site infection										
36		INTRODUCTION	Define exit site infection	C1			Interactive Lecture/SDG	2	MCQs	8
37		Causes	Discuss causes of exited site infection	C2						
38		Symptoms	Discuss symptoms of exit site infection	C2						
39		Complications	Describe the complications of exit site infection	C3						
40	week -6	Treatment	Discuss the treatment of exit site infection	C3						
41		Practical	Assessment of exit site infection in PD patients		P4		Demo	1	OSPE	1
42		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: Mechanical complication of peritoneal dialysis										
43		introduction	Introduction to mechanical complication of peritoneal dialysis	C1			Interactive Lecture/SDG	2	MCQs	3
44		Catheter Malposition and Catheter Obstruction	Discuss Catheter Malposition and Catheter Obstruction	C2						
45	Week-7	Dialysate Leaks, Catheter Breakage and Tubing Kinking	Explain Dialysate Leaks, Catheter Breakage, and Tubing Kinking	C3						
46		Prevention Strategies	Discuss the Prevention Strategies of mechanical complication of peritoneal dialysis	C4						
47		Practical	Assessment of mechanical complication of peritoneal dialysis		P2			1	OSPE	1
48		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: Abdominal wall and pericatheter leak, genital edema										
49	Week-8	Introduction	Introduction to abdominal wall and peri catheter leak, genital edema	C1			Interactive	2	MCQs	5

50		Cause	Discuss abdominal wall and peri catheter leak, genital edema	C3			Lecture/SDG			
51		Symptoms	Discuss the symptoms of abdominal wall and peri catheter leak, genital edema	C2						
52		Prevention Strategies	Describe the prevention of abdominal wall and peri catheter leak, genital edema	C3						
53		Practical	Visit of nephrology ward and dialysis		P4		Demo	1	OSPE	1
TOPIC: Hernia										
54	Week-9	Introduction	Define hernia	C1			Interactive Lecture/SDG	2	MCQs/SEQs	4
55		pathogenesis of hernia	Discuss pathogenesis of hernia	C2						
56		Etiology of hernia	Discuss etiology of hernia	C2						
57		symptoms of hernia	Describe the symptoms of hernia	C3						
58		Treatment	Discuss the treatment of hernia	C2						
59		Practical	Ultrasound examination of hernia		P4		Demo	2	OSPE	-
60		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: Respiratory complication										
61	Week-10	introduction	introduction to Respiratory complication in PD Patients	C1			Interactive Lecture/SDG	2	MCQs/SEQs	4
62		Pleural Effusion	Discuss Pleural Effusion	C3						
63		Hydrothorax and Pneumonia	Discuss Hydrothorax and Pneumonia	C2						
64		Prevention Strategies	Describe the Prevention Strategies of Respiratory complication	C4						
65		Practical	Assessment of Respiratory complications in PD		P4		Demo	2	OSPE	1

			patients through chest x-rays .							
TOPIC: Back pain										
66	Week-11	Introduction	Define back pain	C1			Interactive Lecture/SDG	2	MCQs/SEQs	5
57		Causes of Back Pain in PD Patients	Discuss Causes of Back Pain in PD Patients	C3						
68		Symptoms	Describe symptoms of Back Pain in PD Patients	C2						
69		Management Strategies	Discuss Management Strategies for Back Pain in PD Patients	C3						
70		prevention Strategies	Describe the prevention of Back Pain in PD Patients	C3						
71		Practical	Strategy for prevention of back pain in PD patients		P4		Demo	1	OSPE	-
TOPIC: Metabolic complication of peritoneal dialysis										
72	Week-12	Introduction	Introduction to Metabolic complication of peritoneal dialysis	C1			Interactive Lecture/SDG	2	MCQs/SEQs	2
73		Glucose Metabolism Disorders and Electrolyte Imbalances	Describe Glucose Metabolism Disorders and Electrolyte Imbalances	C2						
74		Acid-Base Disorders, Lipid Metabolism and Protein-Energy Malnutrition	Describe Acid-Base Disorders, Lipid Metabolism and Protein-Energy Malnutrition	C2						
75		Management Strategies	Discuss Management Strategies of Metabolic complication of peritoneal dialysis	C3						
76		Practical	Analyzing Metabolic complications of peritoneal dialysis		P4			1	OSPE	1
77		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC : Glucose absorption, lipid abnormalities, protein loss										

78	Week-13	INTRODUCTION	Introduction to glucose absorption, lipid abnormalities, protein loss	C1			Interactive Lecture/SDG	2	MCQs/SEQs	3
79		Glucose absorption	Discuss Glucose absorption in PD patient	C2						
80		lipid abnormalities	Discuss lipid abnormalities	C2						
81		protein loss	Discuss protein loss in PD patient	C2						
82		Management strategies	Describe the Management of Glucose absorption, lipid abnormalities, and protein loss in PD patient	C3						
83		Practical	To Assess the impact of Glucose absorption, lipid abnormalities, and protein loss in PD patient		P4					
84		SOPs compliance	Adopt how to take care of chart		A4	Role Play				
TOPIC: Hypernatremia and hyponatremia, hypokalemia and hyperkalemia										
85	Week-14	INTRODUCTION	Introduction to hypernatremia and hyponatremia, hypokalemia and hyperkalemia in PD patient	C1			Interactive Lecture/SDG	2	MCQs/SEQs	2
86		Hypernatremia and hyponatremia	Discuss Hypernatremia and hyponatremia in PD patient	C2						
87		Hypokalemia	Discuss hypokalemia in PD patients	C2						
88		Hyperkalemia	Discuss hyperkalemia in PD patient	C2						
89		Management strategies	Describe the management of Hypernatremia and hyponatremia, hypokalemia and hyperkalemia	C3						
90		Practical	Assess impact of Hypernatremia and hyponatremia, hypokalemia and hyperkalemia in PD patient		P4		Demo	2	OSPE	1

91		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
TOPIC: hypocalcemia and hypercalcemia										
92	Week-15	INTRODUCTION	Define hypocalcemia and hypercalcemia	C1			Interactive Lecture/SDG	2	MCQs/SEQs	2
93		causes	Discuss causes of hypocalcemia in PD patient	C2						
93		cause of hypercalcemia	Discuss the causes of hypercalcemia in PD patients	C2						
94		symptoms	Describe the symptoms of hypocalcemia and hypercalcemia in PD patients	C3						
95		Management strategies	Describe the management of hypocalcemia and hypercalcemia in PD patients	C3						
96		Practical	To assess hypocalcemia and hypercalcemia in PD patient		P4		Demo		OSPE	1
97		SOPs compliance	Adopt how to take care of chart			A4	Role Play			
		TOPIC: vascular calcification, acidosis and alkalosis.								
99		INTRODUCTION	Define vascular calcification, acidosis and alkalosis.	C1			Interactive Lecture/SDG			
100		causes of vascular calcification, acidosis and alkalosis.	Discuss causes of vascular calcification, acidosis and alkalosis.	C3						
101	Week-16	symptoms of vascular calcification, acidosis and alkalosis.	Describe symptom of vascular calcification, acidosis and alkalosis.	C2				2	MCQs/SEQs	6
102		Treatment	Discuss the treatment of vascular calcification, acidosis and alkalosis.	C3						
103		Practical	Diagnosis of vascular calcification, acidosis and alkalosis.		P4		Demo	1	OSPE	1
104		SOPs compliance	Adopt how to take care of chart			A4	Role Play			

***Weeks:16 for each subject.**

Recommended Books:
1.Textbook of Peritoneal Dialysis, Nolph and Gokal's, 3rd Edition
2.Peritoneal Dialysis: A Clinical Update, Claudio Ronco, Roberto Dell'Aquila, Maria Pia Rodighiero
3. Oxford Handbook of dialysis, Jeremy Levy, Edwina Brown, Christin Daley and Anastasia Lawrence
4, Handbook of dialysis, John T. Daulrdas, Peter G. Black, Todd, 5th edition

ASSESSMENT BREAKDOWN

S. No	Topics	No of MCQ	No of OSPE / OSCE Stations	Static / Interactive
1	**Malfunctioning catheter**	5	1	Static
2	**Constipation in PD Patients**	3	1	Static
3	**Repositioning peritoneal dialysis catheters**	7	1	Interactive
4	**peritoneal dialysate problem with lactate/ dextrose**	5	1	Static
5	**Peritonitis**	6	1	Static
6	**Exit site infection**	8	1	Static

7	**Mechanical complication of peritoneal dialysis**	3	1	Static
8	**Abdominal wall and pericatheter leak, genital edema**	5	1	Static
9	**Hernia**	4		Static
10	**Respiratory complication**	4	1	Static
11	**Back pain**	5		Static
12	**Metabolic complication of peritoneal dialysis**	2	1	Static
13	**Glucose absorption, lipid abnormalities, protein loss**	3	1	Static
14	**Hypernatremia and hyponatremia, hypokalemia and hyperkalemia**	2	1	Static
15	**hypocalcemia and hypercalcemia**	2	1	Static
16	**TOPIC: vascular calcification, acidosis and alkalosis.**	6	1	Static
Total	**16**	**70**	**14**	**14**

Cognitive domain:

1. Define and explain the different types of complications associated with PD, including:

2. Identify the risk factors and predisposing conditions that contribute to PD complications:

3. Describe the clinical manifestations and diagnostic criteria for PD complications.

4. Explain the principles of prevention and management of PD complications,.

Effective domain:

1. Demonstrate empathy and understanding towards patients experiencing PD complications

2. Develop a positive attitude towards prevention and management of PD complications

3. Foster a collaborative attitude towards multidisciplinary care

Psychomotor domain:

1. Demonstrate proper technique for inserting and securing a PD catheter to prevent mechanical complications.

2. Show proficiency in performing exit-site care and dressing changes to prevent exit-site infections.

3. Demonstrate the correct procedure for connecting and disconnecting PD bags to prevent contamination and infection.

4. Perform a thorough assessment of the PD catheter exit site, including inspection, palpation, and measurement of the exit site.

Course Description:

This comprehensive training program is designed to equip healthcare

professionals with the knowledge and skills necessary to identify, prevent,

and manage complications in patients undergoing Peritoneal Dialysis (PD).

The course will cover the common complications associated with Peritoneal dialysis including mechanical, infectious, metabolic, and cardiovascular complications.

Course Description:

This course will introduce the students to basic concepts of Chronic complication of hemodialysis its causes, clinical presentation, diagnostic investigation, and treatment goal. Students will be able to understand how to interpret chronic complication. It also covers different clinical conditions faced in daily routine post renal disease evaluation. It will help in developing the practical skill of students by determining the differential indication, contraindication and complication during dialysis procedure

Cognitive Domain:

By the end of this subject, students should be able to:

1. Describe chronic complication in hemodialysis
2. Discuss the causes and clinical feature of dialysis complication
3. Explain the differential complication during dialysis
4. Describe therapeutic goal
5. Demonstrate the differential investigation in dialysis unit

Psychomotor Domain:

By the end of this subject, students should be able to:

1. Demonstrate the indication of Chronic complication
2. Demonstrate the difference between Chronic and acute complication
3. Perform clinical examination to know about complication
4. Perform all management of complication, investigations independently

5. Perform clinical & differential diagnosis independently.

Affective Domain:

By the end of this subject, students should be able to:

1. Demonstrate laboratory diagnosis in ESRD patients related complication
2. Follow the specified norms of the IL, SGD teaching & learning effectively
3. Demonstrate humbleness and use socially acceptable language during academic and social interactions with human models, colleagues, and teachers.
4. Demonstrate ethically competent decisions when confronted with an ethical, social, or moral problem in professional or personal life

Comply with SOPs of practical & procedure effectively

Chronic Complication of Hemodialysis ll , RDT-609 3(2+1)

***Weeks: 16**

S.No	Weeks	Content	Learning Outcome	Domain			MIT's	Time/ Hours	Assessment	No of Items
				C	P	A				
TOPIC: CARDIOVASCULAR DISEASE										
1	Week-01	Introduction	Define cardiovascular disease	C1			Interactive Lecture/ SGD	2	MCQS	6
2		Types	Discuss differential types of cardiovascular disease in ESRD patients	C3						
3		Treatment Goal	Discuss management of cardiac problem in dialysis patients	C4						
4		Practical performance	Demonstrate anatomy of heart through chart and model		P4		Demo	1	OSCE/ OSPE	1
5		Behavior	Adopt how to take care of chart and modle			A4	Role play			
TOPIC: PULMONARY PROBLEM										
6	Week-02	Introduction	Define pulmonary problems	C1			Interactive Lecture/SGD	2	MCQS	4
7		Types	Discuss differential types of pulmonary problems	C3						
8		Causes	Describe etiology of Pulmonary problems in hemodialysis patients	C3						
9		Demonstration	Demonstration of pulmonary problems management during dialysis		P4		video/Demo	1	OSCE/ OSPE	1
10		SOPs	Comply to SOPs assess management of pulmonary problem in dialysis patients			A4	Role play			
TOPIC: GASTROINTESTINAL PROBLEM										
11	Week-03	Introduction	Define gastroenterology	C1			Interactive Lecture/SGD	2	MCQS	6
12		GI problem	Discuss differential gastrointestinal problem in dialysis dependent patients	C3						
13		Types	Explain various types of GIT problems	C3						
14		Practical Demonstration	Demonstration of differential diagnosis for upper GI bleeding		P4		Demo	1	OSCE/ OSPE	1
15		SOPs	Comply to SOPs for observation of GI bleeding			A4	Role play			
TOPIC: ASCITES										

16	Week-04	**Introduction**	Define Ascites	C1			Interactive Lecture/SGD	2	MCQS	6
17		Etiology	Discuss Causes of ascites	C2						
18		Associated problem	Discuss problems associated with ascites in dialysis patients	C3						
19		Practical performance	Demonstrate procedure of taping in ESRD patient having ascites		P4		Demo/ Video	1	OSCE/ OSPE	1
20		Consent	Apply ethical consent for Perform procedure of taping in ESRD patient having ascites			A4	Role play			
TOPIC: LIVER DISEASE										
21	Week-05	Introduction	Define liver disease in chronic renal failure	C1			Interactive Lecture/SGD	2	MCQS	4
22		Types	Discuss Differential types of liver diseases	C2						
23		Pathophysiology	Describe pathogenesis of liver disease in dialysis patients	C3						
24		Diagnosis	Describe lab investigations for liver pathologies	C3						
25		Practical performance	Practical demonstration of hepatitis C and B vaccination in dialysis unit		P4		Demo/ Video	1	OSCE/ OSPE	1
26		SOPs compliance	Comply to SOPs for assess Hepatorenal syndrome			A4	Role play			
TOPIC: PANCREATITIS										
27	Week-06	Definition	Define Pancreatitis	C1			Interactive Lecture/SGD	2	MCQS	4
28		Function	Explain function of Pancreas	C2						
29		Pathophysiology	Discuss the pathogenesis of Pancreatitis	C3						
30		Clinical	Describe clinical presentation of Pancreatitis	C2						

		features								
31		Practical performance	Demonstrate laboratory investigation for pancreatitis		P4		Demo/ Video	1	OSCE/ OSPE	1
32		SOPs compliance	Comply to SOPs for assess pancreatitis			A4	Role play			
TOPIC: UROPATHY										
33	Week-07	Introduction	Define uropathy	C1			Interactive Lecture/SGD	2	MCQS	5
34		Names	Enlist various types of uropathy	C2						
35		Causes	Discuss etiology of uropathy in Chronic renal failure	C3						
36		Diagnosis and treatment	Discuss differential management of urinary problem	C3						
37		Practical performance	Assess clinical presentation of patient related urinary problem		P4		Demo/ Video	1	OSCE/ OSPE	1
38		SOPs compliance	Comply to SOPs for observation of urinary problem			A4	Role play			
TOPIC: PYOCYSTIS										
49	Week-08	Definition	Define Pyocystis	C1			Interactive Lecture/SGD	2	MCQS	7
40		Clinical presentation	Explain clinical presentation of chronic renal failure patients associated with pyocystis	C2						
41		Diagnosis	Discuss differential diagnosis of pyocystis	C3						
42		Practical performance	Demonstrate clinical presentation of patients related with pyocystis		P4		Demo/ Video	1	OSCE/ OSPE	1
43		SOPs compliance	Comply to SOPs for observation of diagnostic investigation in pyocystis patients			A4	Role play			

TOPIC: MUSCULOSKELETAL PROBLEM										
44	Week-09	Introduction	Define musculoskeletal problems	C1			Interactive Lecture/SGD	2	MCQS	3
45		Types	Describe different types of musculoskeletal problem	C2						
46		Clinical Features	Describe clinical presentation of musculoskeletal problems associated with hemodialysis	C3						
47		Laboratory Diagnosis	Describe laboratory diagnosis of musculoskeletal problems	C3						
48		Practical performance	Demonstrate investigation of musculoskeletal problem in dialysis patients		P4		Demo/	1	OSCE/ OSPE	1
49		SOPs compliance	SOPs to comply for observation of clinical presentation of musculoskeletal			A4	Role play			
TOPIC: UROGENITAL PROBLEM										
50	Week-10	Introduction	Define urogenital problem	C1			Interactive Lecture/SGD	2	MCQS	2
51		Reproductive system	Explain male and female reproductive system	C2						
52		Names	Enlist urogenital complication in dialysis patients	C1						
53		Pathophysiology	Discuss pathogenesis of urogenital complication	C3						
54		Practical performance	Assess clinical presentation of patients related with urogenital problem		P4		Demo/ Video	1	OSCE/ OSPE	1
55		Ethical norms	Apply ethical norms according to patient for observation of urogenital problem			A4	Role play			
TOPIC: RHEUMATIC DISEASE										
56	Week-11	Introduction	Define rheumatic disease	C1			Interactive	2	MCQS	6

57		Names	Enlist rheumatic diseases	C2			Lecture/SGD			
58		Therapeutic goal	Describe use of antirheumatic drugs in dialysis patients	C3						
59		Pathophysiology	Discuss pathogenesis of rheumatic disease	C3						
60		Practical performance	Demonstrate differential types of rheumatic disease		P4		Demo/ Video	1	OSCE/ OSPE	1
61		SOPs compliance	Comply to SOPs for observation of clinical presentation of rheumatic disease			A4	Role play			
TOPIC: NUTRITIONAL PROBLEM										
62	Week-12	Introduction	Define nutritional status in hemodialysis patients	C1			Interactive Lecture/SGD	2	MCQS	5
63		Importance	Explain importance of nutrition in hemodialysis patients	C2						
64		Types	Discuss various types of nutritional complications in hemodialysis patients	C3						
65		Pathophysiology	Describe the pathogenesis of nutritional problem	C3						
66		Practical performance	Demonstrate specific charts of nutritional status for hemodialysis patients		P4		Demo/ Video	1	OSCE/ OSPE	1
67		SOPs	Comply to SOPs for observation of nutritional problem			A4	Role play			
TOPIC: DIALYSIS IN INFANT AND CHILDREN										
68	Week-13	Introduction	Define dialysis	C1			Interactive Lecture/SGD		MCQS	3
69		Types	Discuss the modalities of dialysis	C2						
70		Laboratory diagnosis	Explain the laboratory diagnosis of dialysis in infant and children	C3						
71		Procedure	Discuss the procedure of hemodialysis in infants and children	C4						

72		Practical performance	Demonstrate prescription of hemodialysis in infants and children		P4		Demo/ Video	1	OSCE/ OSPE	1
73		SOPs compliance	Comply to SOPs for observation of dialysis in infant and children			A4	Role play			
TOPIC: OCULAR COMPLICATION										
74	Week-14	Introduction	Define ocular complication	C1			Interactive Lecture/SGD	2	MCQS	3
		Pathophysiology	Discuss Pathogenesis of ocular complications	C2						
75		Clinical features	Explain Clinical presentation of ocular complication	C2						
76		Laboratory diagnosis	Demonstrate Laboratory Diagnosis of ocular complication	C3						
77		Practical performance	Observation of ocular complication in dialysis patient		P4		Demo/ Video	1	OSCE/ OSPE	1
78		SOPs compliance	Comply to sops for observation of ocular problem in dialysis patients			A4	Role play			
TOPIC: NEUROLOGICAL PROBLEM										
79	Week-15	Introduction	Define neurological problems	C1			Interactive Lecture/SGD		MCQS	2
80		Types	Discuss various types of neurological problem	C2						
81		Diagnosis	Describe laboratory diagnosis of neurological problems in hemodialysis patients	C3						
82		Treatment	Explain management of neurological problem	C3						
83		Practical performance	Demonstration practical observation of clinical features of neurologic problem		P4		Demo/ Video	1	OSCE/ OSPE	1

84		SOPs compliance	Comply SOPs for observation of clinical presentation associated with neurological problem			A4	Role play			
TOPIC: Valvular disease										
85	Week-16	Introduction	Define valvular disease	C1			Interactive Lecture/SGD	2	MCQS	4
86		Causes	Discuss etiology of valvular disease	C2						
87		Diagnosis	Describe investigation of valvular disease	C2						
88		Types	Explain differential types of valvular disease	C3						
89		Practical	Demonstration differential types of valvular disease during dialysis		P4		Demo/ Video	1	OSCE/ OSPE	1
90		Comply to SOPs	Comply to SOPs for observation of valvular disease		A4	A3	Role play			

Recommended Books:

1. Renal dialysis hand book of Daugerdaus 5th edition
2. Oxford handbook of Nephrology and hypertension simon steddon 2nd edition

Assessment Breakdown				
S. No	**Course Content**	**No of Mcqs**	**No of OSPE/OSCE Stations**	**Interactive/Static**
1.	Cardiovascular Disease	06	01	Static
2.	Pulmonary problems	04	01	Interactive
3.	Gastrointestinal problem	06	01	Static
4.	Ascites	06	01	Interactive
5.	Liver disease	04	01	Static
6.	Pancreatitis	04	01	Static
7.	Uropathy	05	01	Static
8.	Pyocystis	07	01	Static
9.	Musculoskeletal problem	03	01	Static
10.	Urogenital problem	02	01	Static
11.	Rheumatic disease	06	-	-
12.	Nutritional complication	05	01	Static
13.	Dialysis in infant and children	03	-	-
14.	Ocular complication	03	01	Static
15.	Neurological problem	02	01	Static
16.	Valvular disease	04	01	Static
TOTAL	**16**	**70**	**14**	**14**

Subject:

Urological procedure I, RDT-613 3(2+1)

Weeks 16

Course Description:

This course teaches students the concepts and procedures for maintaining urology patients' upper urinary tract. It covers the diagnosis, prevention, and management of urological complications. Students will well understand about ethical consent, behavior management, urology patients' complication, and urological procedures that are specific to the requirements of post renal disorders. By the end of successful completion of this course, students will be able to investigate different post renal disorder and manage post operative complications of urological procedures.

Cognitive Domain:

By the end of this subject, students should be able to:

1. Describe the upper urinary tract anatomy and its disorder
2. Discuss the embryology of kidney and ureter
3. Explain the congenital abnormalities of kidney and ureter
4. Describe the differential urological procedures
5. Demonstrate the differential investigation in urological procedure

Psychomotor Domain:

By the end of this subject, students should be able to:

1. Demonstrate the indication of procedure of upper urinary tract
2. Demonstrate the difference between upper & lower urinary tract disorder
3. Perform clinical examination to know about any disorder related to upper urinary tract
4. Perform all urological procedure investigations independently
5. Perform clinical & differential diagnosis independently

Affective Domain:

By the end of this subject, students should be able to:

1. Demonstrate laboratory diagnosis in post renal disorder
2. Follow the specified norms of the IL, SGD teaching & learning effectively
3. Demonstrate humbleness and use socially acceptable language during academic and social interactions with human models, colleagues, and teachers.
4. Demonstrate ethically competent decisions when confronted with an ethical, social, or moral problem in professional or personal life

Comply with SOPs of practical & procedure effectively

S.No	Weeks	**Content**	**Learning Outcome**	Domain			MIT's	Time/ Hours	Assessment	No of Items
				C	P	A				
TOPIC: Anatomy of Kidney										
1	Week-01	Introduction	Gross appearance of kidney	C1			Interactive Lecture/ SGD	2	MCQS	6
2		Relation	Explain relationship of kidney with other organs	C2						
3		Histology	Discuss histology of Kidney	C3						
4		Tissues	Explain supporting tissues of kidney	C2						
5		Vascular supply	Discuss arterial, venous and nerve supply of kidney	C3						
8		Practical performance	Demonstrate the relation of kidney with other organs through charts		P4		Demo	1	OSCE/ OSPE	1
9		Behavior	Adopt how to take care of chart			A4	Role play			
TOPIC: Anatomy of Ureter										
10	Week-02	Introduction	Gross Appearance of Ureter	C1			Interactive Lecture/SGD	2	MCQS	4
11		Relation	Explain Relation of ureters with other organs	C2						
12		Histology	Discuss histology of ureter	C3						
13		Tissues	Explain the supporting tissues of the kidney	C2						
14		Practical	Demonstration the relation of ureter with another organ through charts		P4		Demo	1	OSCE/ OSPE	1
15		Behavior	Adopt how to take care of chart			A4	Role play			

TOPIC: EMBRYOLOGY OF KIDNEY										
16	Week-03	Introduction	Define Embryology	C1			Interactive Lecture/SGD	2	MCQS	4
17		Nephric system	Explain the nephric system of the kidney	C2						
18		Kidney Embryology	Discuss differential stages of kidney development	C3						
19		Practical demonstration	Perform steps of kidney development through chart		P4		Demo	1	OSCE/ OSPE	1
20		Behaviors	Adopt how to take care of chart			A4	Role play			
TOPIC: EMBRYOLOGY OF Ureter										
21	Week-04	Introduction	Define embryology	C1			Interactive Lecture/SGD	2	MCQS	6
22		Tubular System	Explain the anatomy of calyces, pelvis, and ureter	C2						
23		Embryology of ureter	Discuss embryology of ureter development.	C3						
24		Practical	Demonstrate differential steps of ureter development through chart		P4		Demo/ Video	1	OSCE/ OSPE	1
25		Behaviors	Adopt how to take care of chart			A4	Role play			
TOPIC: POLYCYSTIC KIDNEY DISEASE										
26	Week-05	Names	Enlist differential congenital abnormal kidneys	C1			Interactive Lecture/SGD	2	MCQS	6
27		Introduction	Define polycystic kidney	C1						
28		Types	Explain types of polycystic kidney disease	C2						
29		Etiology	Discuss causes of polycystic kidney disease	C3						
30		Pathogenesis	Explain the Pathophysiology of polycystic kidney disease	C3						
		Clinical Features	Explain the clinical presentation of polycystic kidney	C3						

31		Diagnosis	Discuss the differential diagnosis of polycystic kidney disease	C4						
32		Practical performance	Assessment of differential diagnosis of polycystic kidney		P4		Hands-on Demo/ Video	1	OSCE/ OSPE	1
33		Ethical norms	Apply ethical norms according to patient's need for observation of a patient having polycystic kidney			A4	Role play			
TOPIC: CROSS DYSTOPIA										
34	Week-06	Definition	Define Cross dystopia	C1			Interactive Lecture/SGD	2	MCQS	4
35		Types	Explain differential types of cross dystopia	C2						
36		Pathophysiology	Describe pathogenesis of cross dystopia	C3						
37		Clinical features	Illustrate clinical presentation of cross dystopia	C3						
38		Lab diagnosis	Describe lab investigations for different type of cross dystopia	C4						
40		Practical performance	Demonstrate diagnostic investigation of cross dystopia		P4		Demo/ Video	1	OSCE/ OSPE	1
41		Consent	Apply consent for observation of cross dystopia in ultrasound and CT scan			A4	Role play			
TOPIC: HYDRONEPHROSIS										
42	Week-07	Introduction	Define of Hydronephrosis	C1			Interactive Lecture/SGD	2	MCQS	5
43		Pathophysiology	Explain the pathogenesis of hydronephrosis	C2						
44		Morphology	Discuss unilateral a bilateral morphology of hydronephrosis	C3						
45		Clinical Features	Discuss the clinical presentation of hydronephrosis	C3						
46		Diagnosis and treatment option	Describe the investigation and indication of pyeloplasty	C3						

48		Practical performance	Demonstrate practical Observation of pyeloplasty		P4		Demo/ Video	1	OSCE/ OSPE	1
49		Consent	Apply consent for asses pyeloplasty			A4	Roleplay			
TOPIC: HORSESHOE KIDNEY										
50	Week-08	Introduction	Define horseshoe kidney or renal fusion	C1			Interactive Lecture/SGD	2	MCQS	3
51		Etiology	Explain the causes of renal fusion	C2						
52		Vascular supply	Describe blood supply of horseshoe kidney	C2						
53		Laboratory diagnosis	Discuss laboratory diagnosis of horseshoe kidney	C3						
		treatment	Explain supportive treatment							
54		Clinical features	Describe clinical features of horseshoe kidney	C3						
55		Practical performance	Examine through ultrasound and IVP of horseshoe kidney		P4		Hands-on Demo/ Video	1	OSCE/ OSPE	1
56		Comply to SOPs	Comply to SOPs for horseshoe kidney			A4	Role play			
TOPIC: URETERIC CALCULUS										
57	Week-09	Introduction	Define ureteric calculus	C1			Interactive Lecture/SGD	2	MCQS	7
58		Pathophysiology	Discuss Pathogenesis of ureteric calculus	C3						
59		Clinical Features	Explain Clinical presentation of ureteric calculus	C2						
60		Laboratory Diagnosis	Discuss Laboratory Diagnosis of ureteric calculus	C3						
62		Practical performance	Examine ureteric calculus through x-ray and intravenous pyelography		P4		Demo/	1	OSCE/ OSPE	1

63		Consent	Apply ethical consent for observation of a patient having ureteric calculus			A4	Role play			
TOPIC: CONGENITALY DOUBLE URETER										
64	Week-10	Introduction	Define congenital double ureter	C1			Interactive Lecture/SGD	2	MCQS	4
65		Types	Describe differential types of double ureter	C2						
66		Clinical Features	Demonstrate clinical presentation of double ureter	C3						
67		Treatment	Describe differential surgical treatment option	C3						
71		Practical performance	Examine double ureter through CT scan and MRI		P4		Demo Group Discussion	1	OSCE/ OSPE	1
72		Consent	Apply ethical consent for observation of complication in patient having double ureter			A4	Role play			
TOPIC: RENAL CALCULUS										
73	Week-11	Introduction	Define renal calculus and its site of formation	C1			Interactive Lecture/SGD	2	MCQS	3
74		Types	Discuss differential types of stone and its incidence rate	C2						
		Morphology	Discuss morphology of differential renal calculus	C3						
75		Clinical Features	Describe clinical presentation of renal calculus	C3						
76		Practical performance	Examine renal calculus through x-ray and ultrasound		P4		Demo / Charts/Group Discussion	1	OSCE/ OSPE	1
77		Ethical norms	Apply ethical norms according to patient for observation of a patient having renal calculus			A4	Role play			
TOPIC: RENAL TRANSPLANTATION										
78	Week-12	Introduction	Define Renal transplantation	C1			Interactive	2	MCQS	4

79		Classification	Classify donor criteria	C2			Lecture/SGD			
80		Contraindication	Discuss contraindication of renal transplant surgery.	C3						
81		Risk and Complication	Discuss risk and complication of renal transplantation	C4						
82		Diagnosis	Discuss the laboratory diagnostic investigation of donors and recipient renal transplant surgery	C4						
84		Practical performance	Assess the postoperative management of renal transplantation		P4		Demo/ Charts/Video	1	OSCE/ OSPE	1
85		Consent	Apply ethical consent for observation of a recipient patient			A4	Role play			
TOPIC: NEPHROLITHOTOMY										
86	Week-13	Definition	Define nephrolithotomy	C1			Interactive Lecture/SGD		MCQS	4
87		Indication	explain indication of nephrolithotomy	C2						
		Contraindication	Explain contraindication of nephrolithotomy	C3						
88		Lab diagnosis	Discuss the laboratory diagnosis of nephrolithotomy	C3						
89		Practical performance	Assess the investigation of nephrolithotomy		P4		Case Study/ Video	1	OSCE/ OSPE	1
90		Ethical norms	Apply ethical norms according to patient for observation of patient having surgery of renal calculus			A4	Role play			
TOPIC: URETEROLITHOTOMY										
91	Week-14	Definition	Define ureter lithotomy	C1			Interactive Lecture/SGD	2	MCQS	3
92		Indication	explain indication of ureter lithotomy	C2						
93		Contraindication	Explain contraindication of ureter lithotomy	C3						

94		Laboratory diagnosis	Discuss the laboratory diagnosis of ureter lithotomy	C4						
95		Practical performance	Assess the investigation of ureter lithotomy		P4		Demo/ Video	1	OSCE/ OSPE	1
96		Consent	Apply ethical consent for observation of patient having surgery of ureteric calculus			A4	Role play			
TOPIC: RE-IMPLANTATION OF URETER										
97	Week-15	Definition	Define re-implantation of ureter	C1			Interactive Lecture/SGD		MCQS	4
98		Etiology	Discuss the etiology of reimplantation of ureter	C2						
99		Contraindication	Explain the contraindication of ureter reimplantation	C3						
100		Laboratory investigation	Discuss the laboratory investigation for re-implantation	C3						
103		Practical performance	Assess the investigation of Re-implantation of ureter in urology OT		P4		Practical Demo/ Video	1	OSCE/ OSPE	1
104		Consent	Apply ethical consent for observation of patient having surgery of re-implantation of ureter			A4	Role play			
TOPIC: PYELOPLASTY										
105	Week-16	Definition	Definition of pyeloplasty	C1			Interactive Lecture/SGD	2	MCQS	3
106		Types	Explain types of pyeloplasty	C2						
110		Contraindication	Discuss contraindication of pyeloplasty	C3						
111		Practical performance	Observation of urological procedure of pyeloplasty		P4		Practical Demo/ Video	1	OSCE/ OSPE	1
112		Consent	Apply ethical consent for observation of patient having surgery			A4	Role play			

			of pyeloplasty							

Recommended Books:
1. Lange medical book of urology - 17th edition Smith's general urology 2. Nancy Marie phillips 11th edition Bery kohens operating techniques

Assessment Breakdown

S. No	Course Content	No of Mcqs	No of OSPE/OSCE Stations	Interactive/Static
1.	Anatomy of kidney	06	01	Static
2.	Anatomy of ureter	04	01	Interactive
3.	Embryology of kidney	04	01	Static
4.	Embryology of ureter	06	01	Interactive
5.	Polycystic kidney disease	06	01	Static
6.	Cross dystopia	04	01	Static
7.	Hydronephrosis	05	01	Static
8.	Horseshoe kidney	03	01	Static
9.	Ureteric calculus	07	01	Static

10.	Continental double ureter	04	01	Static
11.	Renal calculus	03	-	-
12.	Renal transplantation	04	01	Static
13.	Nephrolithotomy	04	-	-
14.	Ureterolithotomy	03	01	Static
15.	Re implantation of ureter	04	01	Static
16.	Pyeloplasty	03	01	Static
TOTAL	**16**	**70**	**14**	**14**